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CONTENTS

	PAGE
THE WITWATERSRAND AND THE REVOLT OF THE CITLANDERS. With Illustrations. GEORGE F. HOOKER	249
THE ECONOMIC ASPECTS OF SOIL PRODUCTION. DR. H. S. BRADLEY	263
A CRITICAL PERIOD IN SOUTH AFRICAN HISTORY.	273
PROCEEDINGS OF THE NATIONAL GEOGRAPHIC SOCIETY.	279
MISCELLANEA.	290

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THE WITWATERSRAND AND THE REVOLT OF THE
UITLANDERS*

By GEORGE F. BROWN,

United States Geological Survey

The South African Republic, or, as it is more often called, The Transvaal, lies in southeastern Africa, between the Limpopo or Crocodile river on the north and the Vaal river on the south. Portuguese and British possessions shut it off from the Indian ocean on the east, and the country to the north and west of the republic is also British. The Vaal river is tributary to the Orange, which flows into the Atlantic, while the Limpopo empties into the Indian ocean. The watershed between these rivers is the Witwatersrand, or white-water-range, which trends nearly east and west about south latitude 26°, and is therefore only 150 geographical miles from the tropic of Capricorn.

The Transvaal may be roughly described as an elevated plateau, most of which lies between 4,000 and 6,000 feet above sea level. To the north of the Witwatersrand the general level is not much over 4,000 feet. Immediately to the south of this watershed, near Johannesburg, the elevation is about 6,000 feet, gradually diminishing toward the Vaal. The general aspect of the country reminds one of the Larzac¹ plains, but the rainfall averages about 30 inches, and the climate is mild and equable. The soil is only moderately fertile, and 15 years ago the country was considered fit for nothing but pastoral occupation.

The Witwatersrand, in the neighborhood of Johannesburg, consists of upturned edges of a thick mass of quartzites, shales, and conglomerates, known as the Lower Cape formation. These

* Paper read before the National Geographic Society, October 16, 1895.

rocks are of Paleozoic age, but carry no fossils. The conglomerates of this group almost all contain more or less gold. The most famous mines of the Transvaal are opened upon a certain set of these conglomerate beds known as the Main Reef series. Resting unconformably on the Lower Cape is another group known as the Upper Cape and containing one bed of conglomerate, the Black Reef, which has been profitably worked for gold at some points. An extensive sheet of dolomite forms one member of the Upper Cape. Unconformably on the Upper Cape lies the Triassic, carrying very extensive beds of coal, one of the treasures of the Transvaal of which little is heard outside of South Africa. As the country is also rich in iron ore, one may expect to hear more in the future than in the past of these coal fields. Meantime they supply the gold-mining industry with good and cheap fuel. The Lower Cape formation, with the Main Reef series, is exposed only to a limited extent. Within less than 20 miles of Johannesburg, both to the east and west, the Upper Cape and the Triassic beds flood the country, and for a long distance only an occasional glimpse is to be had of the Lower Cape with its auriferous conglomerate. It is said by various engineers to reappear occasionally for hundreds of miles from Johannesburg—as, for instance, in Zululand—and to be more or less auriferous wherever found. It need hardly be remarked that the search for the Main Reef beneath the Trias is most arduous. That it will eventually be traced far beyond the surface exposures of the district is quite certain.

In this paper the Witwatersrand district alone is of especial interest, but in conveying a general notion of the Transvaal it must be remarked that this is by no means the only auriferous district in the republic. There are four other districts, containing in all ten mines, which yield at the rate of over \$100,000 each annually. Of these the Klerksdorp district carries gold in conglomerates. In the three other districts the gold is found in ordinary veins. The Shoba mine, in the De Kaap district, has yielded over \$5,000,000. Four of the important mines lie in the Lydenburg district, and one, the Sutherland, in the Zoutpansburg district. The total gold product of the Transvaal for 1895, outside of the Witwatersrand, was \$3,581,000, while the Rand alone yielded \$78,110,000.* Statistics show that the yield of the outside mines is increasing about as rapidly as that of the Rand.

* For comparison it may be noted that the United States produced in 1895 \$46,000,000 worth of gold, or about \$4,000,000 more than the Transvaal.

The great gold deposits of the Rand are beds of conglomerate, known in South Africa as "banket" or "reef." They crop out for some 25 miles at a distance of from one to two miles from the crest of the Witwatersrand, and usually dip near the surface at an angle of 45° or more. When followed downward the dip diminishes somewhat rapidly to 25° or less. None of the mines are yet very deep; none in fact reach 2,000 feet, but the reefs have been found by the diamond drill to a depth of 2,500 feet. The structure of the country seems to show that below the 2,000-foot level the reefs will continue for a long distance at a moderate angle. How deep mining can be carried on may be more or less questionable, but the mining engineers on the Rand confidently believe that they can get down 5,000 feet, and I agree with them. The ore of the Rand is phenomenally uniform for an auriferous deposit. While it is locally patchy, considerable areas show only moderate fluctuations from a general average. The quantity of gold can be computed with something like the same confidence that the amount of coal in a coal seam can be calculated. Such a computation is in the nature of things only a first approximation, but within certain limits it has a value. Estimates of this kind for the whole area or portions of it have been made by various experts, among whom may be mentioned Mr Hamilton Smith, Bergrath Schmeisser, of the Prussian mining service, Mr John Hays Hammond, Messrs Hatch and Chalmers, and Professor De Launay, of the Paris School of Mines. These estimates accord fairly well. The latest is Professor De Launay's, who, after a review of the other estimates, calculates by a method of his own that to a depth of 1,000 meters (2,381 feet) and for a length of outcrop of 25 miles the amount of gold accessible is 13 or 14 milliards of francs, or from 2,000 to 2,800 million dollars. This would give down to the 5,000-foot level from 3,062 to 4,237 million dollars. Other of the estimates, similarly treated, would give still larger values. Hatch and Chalmers, on the other hand, estimate that the Rand proper, together with outlying portions of the district (all within about 20 miles of Johannesburg), will yield down to the 5,000-foot level about 3,500 million dollars. I have not been able to find any grounds for regarding this as an overestimate, and I know of no one familiar with the deposits who thinks it exaggerated.

The sketch of the character and resources of the Transvaal just given contains nothing new. It has been outlined in order to indicate how it happens that a community has suddenly sprung

up at Johannesburg, composed of enterprising, highly intelligent, and perhaps somewhat impatient men, hailing from many different lands—men as different as possible from the pastoral pioneers who compose the South African Republic. The Boers and the foreigners, or "Uitlanders," as they are called in Dutch, were not congenial and the great mining camp has all along constituted a menace to the peace of the Republic. As every one now knows, the threatened danger was not averted.

The dramatic incidents which have taken place in the Transvaal during the past ten months have drawn the attention of the whole world to that country. The interest in these events felt in the United States has been little less intense than that in Great Britain. This is entirely natural, for many of the leading men in Johannesburg are Americans; indeed, the mining industry is chiefly under the guidance of American engineers, and the United States was represented on the reform committee by seven members. It really behooves the American public therefore to know how prominent American representatives of an important profession have behaved themselves under trying circumstances. While there is a natural sympathy in the United States for Anglo-Saxons taking up arms for their rights, we, as Republicans, also sympathize with the South African Republic in the endeavor to maintain its independence. This fellow-feeling makes it all the more interesting and important to examine carefully and, if haply such a thing is possible, impartially as well as carefully, into the causes and conduct of the revolt.

I wish this inquiry had fallen into other hands than mine, but I happened to visit the country in April for a stay of some months; several of the condemned men are old friends of mine as well as colleagues, it naturally fell to my part to make such efforts in their behalf as I could, and still in spite of these personal relations it is clear to me that there is much to be said on the Boer side of the questions at issue. So far as opportunities go, therefore, I am perhaps in as good a position as any one can be to review the circumstances without prejudice. The great difficulty in this, as in any inquiry of an historical nature, is to ascertain the facts, for these are differently represented by different though seemingly well-informed persons. I trust it will be found that I have measurably succeeded.

It would be impossible to understand the conditions which led to the grievances of the Uitlanders without considering some

of the influences which have made the Dutch colonists or Boers what they are. The Boers are most closely related to us ethnologically, but their political and industrial history has been so different that jealousies and antagonisms have arisen which, though highly regrettable, are by no means without excuse.

The Boers, like the English, are in the main of Teutonic blood, with a relatively small infusion of French stock. Like the English, they are stubborn, self-reliant, fond of the chase, and admirably adapted to cope with the difficulties incident to colonization in a country occupied by savage beasts and still more savage men. The Boer ideal seems to be life on a large estate, with plenty of sport and the occupation of not too exigent stockbreeding and farming. So far their tastes do not differ greatly from those of many Englishmen, but they are for the most part ignorant of the refinements of life so dear to advanced Anglo-Saxons, and perhaps on this account they are almost devoid of the commercial instincts through which such tastes might be gratified. They are, it is said, usually able to read and write, but for the most part their reading is confined to the Bible. They are highly religious, and the Bible appeals to them as to few other peoples, because the scenery and material conditions of the Book are so similar to those by which they are surrounded. The very animals are the same. Their religion is somber and puritanical: it is that of the Old Testament, with little sweetness or mercy in it. Under normal conditions the Boers are generously hospitable and they are brave. It is true that Englishmen have sometimes reviled them as cowardly, but their whole history, and particularly the battles of Boomplaats and Majuba Hill, shows the contrary. The accusation seems to be due in part to the fact that like all continental Europeans they are greatly averse to fisticuffs, and partly to the fact that in fighting with rifles they avail themselves of cover whenever they can. Taking advantage of cover I understand to be a well-established principle of all modern tactics.

Many of them are said to be untruthful, at least in matters of business. This is not strange, for it was long ago observed that financial responsibilities do more than the most stringent religion or than amiability and bravery to foster a high standard of truthfulness. The Boers are sometimes spoken of as a degenerate race, but this is certainly a slander. They usually possess an excellent physique, and it is perfectly well known that one or two generations of education put the Dutch colonist

on a par with men of any nationality. The struggle for existence and for freedom has saved them from mental stagnation. That they are backward as a race, according to our standards, is true. Much of the seventeenth century still clings to them, but they have lost none of the capacity for advance.* The most important of all the characteristics of the Transvaal Boer is his passion for freedom or, what in his case is tantamount to the same thing, his horror of British domination. In 1880 the women of the Transvaal urged their sons and husbands to arms, bidding them die like patriots, if need were. This passionate horror of English rule is an historical development. The Boers have had little opportunity to observe how mild and beneficent English rule can be under certain circumstances.

Cape Colony passed into the possession of the British Crown by force of arms in 1806, and was formally ceded by the Prince of Orange in 1814. The white population of the Cape at that time consisted of the descendants of Dutch colonists and French Huguenots. The latter had found their way to Africa through Holland after the revocation of the Edict of Nantes in 1685. At no time did the Huguenots exceed one-sixth of the colonists, or, if the Dutch East India Company's servants are counted, one-eighth of the total European population. The colonists had little intercourse with Europe during the 18th century. Like other colonists of the time, they owned slaves, their lives were pastoral and agricultural, and, except for the Bible, their studies were confined to westerlank. The petty impositions of the Dutch East India Company had made them unscrupulous so far as transactions with the government were concerned; the incurable carelessness of Hottentot servitude had weakened the habits of cleanliness which they had brought from Holland, and the possession of slaves had produced its usual deleterious effects.

* Mr John Stoen, in his *Story of the Transvaal*, 1888, which certainly cannot be accused of partiality to the Dutch colonists, says: "I have the pleasure of acquainting many intelligent and educated Boers among my acquaintance, and I desire to put on record my opinion that a 'good' Boer is quite equal to a good Englishman. Nay, in one respect he is better, for he adds to the virtues of an Englishman an unbounded and generous hospitality. . . . The educated Boer is a splendid man. . . . No one can deny that on that day [May 24] the Boers fought bravely and well."

The Uitlanders commonly form an extremely unfavorable opinion of the Boer. They do not desire free hospitality and they are nothing at his quarters as a planter, while in business they find him suspicious, over-cautious, and behind the age; but it would not be fair to judge of a people like the Boers entirely from a commercial standpoint. The Boer, on the other hand, is not without justification for suspecting English designs on his independence, and he can point to many instances of the British government which have not been furnished; but it is not fair to judge a people like the English entirely from a political standpoint.

land left but had not so much of any kind as

of Slachters Nek.* Two of the most potent forces and are Dou-

imprisonment, or fines. This cruel sentence, full need by a com-
munication, has never been forgotten by the Dutch and shall be
in wonder. The use of the Dutch language was forbidden in
the courts of Cape Colony in 1847, and for a short time those
who did not understand English were even denied the right to
any duty. In 1854 the slaves were emancipated suddenly by
act of Parliament. The emancipation proposed was only em-

rection in the courts that the relations in many cases existed
only a fifth or a sixth of the actual value, and sometimes nothing
at all. Many families were reduced to want, and great misery
was caused by the injudicious execution of a measure the prin-
ciple of which was laudable. The emancipated negroes were

government refused to pass stringent laws to control the blacks,

on the subject of the un-yetted brotherhood of man, and it was

also equally on a par with white comic natives. The Dutch knew

black drew down on them the wrath of the missionaries, who
were extremely influential both in London and Cape Town.
There seems to be no doubt that the Dutch were represented as
far more cruel to the natives than they really were, while the

and we have seen how the un-yetted brotherhood of the Dutch and
the English was founded by the a nation of power.

* Slachters Nek, the Dutch name for the Cape of Good Hope.

† The Dutch government made no laws to control the blacks and the missionaries
were extremely influential both in London and Cape Town. There seems to be no doubt
that the Dutch were represented as far more cruel to the natives than they really were,
while the English were represented as far more humane than they really were.

great "Trek" or emigration of the Boers, from Cape Colony in 1836-37. Taking only their goods and such movables as they could load on their wagons, thousands left the country. The emigrants themselves maintained that they left the colony not

voluntarily, but were driven out by the British Government. In a manifesto by one of their principal men, Louis Rietoff, written in 1837 it is asserted, "We quit the colony under the assurance that the English government had a thing to do to repair it and to reward a few us as going over ourselves with the interference in the future." Was a hope!

In migrating into the wilderness, the Boers naturally came into contact with the natives, and the progress of the United States, were seen or felt in the West Coast of Africa, and the attention of the Cape Government was directed to other her race, which includes the Zulus, Basutos, Hottentots, etc. These people are of a dark bronze hue, and have good athletic figures. They possess some excellent traits but are horribly cruel when once they have smelt blood. The Basutos appear to have received the same as the other tribes, having lost their European, having lost Hottentots and Basutos as they advanced, and waging for one tribe against another. Again and again a native tribe, effectively organized and

When their witch-hating ceremonies are considered as supplementing the unquenching slaughter of war, it is remarkable that they could become a nation of peace and order. Nothing but the phenomenon of the founding of the race has kept up its numbers.

The trekking Boers have not yet been who held the other side only by the right of recent and bloody conquest and to whom battle was the object of life. If the Boers had small compensation for taking land from them, it is perhaps not to be wondered at. The Boers paid for it like the Basutos, with blood. The history of the conflicts between the Boers and Zulus is wholly romantic. It has been written and is not repeated here.

dated by the British Government in 1817.

of the Cape river as the result of independent conflicts by the Zulu and the Boers.

When they left Cape Colony a portion of the land settled in



Natal, after the loss of a great part of their numbers from hostility along their borders by the Zulu chief, Dingane. The British had repeatedly refused to annex Natal, but after the Boers had been

"

took possession, and to escape them most of the Boers trekked again to the north of the Orange river, where many of the trekboers had previously been in 1835-37. Repented official declarations had been made that the British dominion would not be extended to the northward of that river. Nevertheless in 1848 British sovereignty was proclaimed over the region between the Orange river to the south and the Vaal to the north, practically now then now occupied by the so-called Free State. The Boers retained the annexation; two of their number were hanged and the property of other residents was confiscated. As early as 1847 many Boers had entered the Transvaal. After the annexation of the country to the south, many more crossed the Vaal. In 1852 the population amounted to about 7,000 white families, and the total population of the Transvaal was acknowledged by England in the 1854 River Convention.

In 1877 the Transvaal was annexed by England on the plea that a two week war of the state was a menace to English interests.* The annexation of the Boers to the British empire had not been justified, nor were there without grave reasons for dissatisfaction. It is acknowledged by men of all parties and

"

were not kept.† In 1880 the rebellion broke out and was again

the Transvaal was again acknowledged in 1881, but, though with the reservation of British suzerainty. In 1884 the relation of the two countries was further consolidated by a convention, which is still in force. In this document the only explicit right reserved to Great Britain as one of ratifying treaties between the two nations is foreign powers.

A statement has been made in the foregoing paragraphs to show the origin of the hostility and distrust with which the Boers regard the English,† but it is not to be inferred that the

* Presentation of memorials and address of Sir F. Coleridge. The only power equal. In 1877 it is stated that the Boers were not kept.

† The N. B. is the only one. For more of the other promises which were expressed at the time of the annexation of the Boers.

"

10. Mr. Theobald is generally regarded as the best authority and impartial historian.

British policy in South Africa has been one of consistent and

unflinching firmness, through ignorance in the colonial office of conditions in South Africa, and through the necessities of strategy or domestic considerations. Many of the British governors have lost reputation and have been recalled in consequence of the Falmouths. But South Africa has gained little by the penalties meted out to her rulers. In public affairs wisdom is more useful than virtue, for we can, though we cannot, only be a nation, and still we be regarded as even better placed for it.

Gold had been discovered in the Transvaal in the Lydenburg district as early as 1867, and prior to 1887 it had been found at other points as well, but none of these discoveries were of a very serious importance. The massive deposits of the Witwatersrand were discovered in 1887.

The Witwatersrand is a gold-producing district has no parallel in history. It is now producing from an area no larger than the district of London at the rate of more than £4,000,000 worth of gold annually, and it has been no other. There are good reasons for believing that the ultimate total production will be

the product of the Comstock body. Production did not begin until 1887. At present, Johannesburg, the chief town of the district, grows with the utmost rapidity.

A census of the district within three miles of Market Square was taken in July 1894. It numbered 51,923 whites and 51,510 colored people. Even then the enumerators missed some residents, but probably no large proportion of them.

The sudden development of this vast industry naturally produced an enormous effect upon the local and foreign customers of the Transvaal, although the buyers did not take part in the exportation of gold. The buyers sold and delivered the gold and silver, and the gold and silver at high rates, sold produce at high

¹ In January 1894, about £4,000,000 worth of gold.

² The value of the gold.

³ Note the enormous amount

testified by the fact that the public revenues in 1844 were six times that of 1836. The Boers did not foster the foreign community on the land, on either of its two offered lines of expansion. On the contrary, they had stood, and actually threw many obstacles in the way of the progress of the industry

born of British invasion, the independence which they had

a powerful motive, and they were in danger of seeing their freedom by a process of absorption into a larger community growing a more even model.

That they should resist the new form of conquest by every means available to them was inevitable. Indeed, any other course would have implied a loss of type and form. The only available means of retaining control of their own destiny was to resist the encroachment of the franchise diffusion, if not impossible, as in this perhaps the expense to the state was properly taken.

So far as I can learn both the liberal or progressive party and the conservative or Deputer party of the republic are in accord

On other points they differ. The conservatives, who are represented by the present administration, do not include among their members a sufficient number of educated and professional men to fill the offices rendered useful by the new order of things. They cannot draw largely on the opposition to fill these places, and few of the more Boer, being British subjects, are available for the execution of the "English policy." John O. is to be sent to the President Kruger is almost forced to turn his considerable part of Imperial speech to carry out the Deputer program. The way, however, from Hongkong to Johannesburg and other

ways cannot yet be a fact when it is greatly to increase the influence of the Dutch in the Transvaal. It would also seem to be a deliberate plan with the conservative party to resist the initiative of the British and to use as far as possible by means of the Dutch, from which the republic has nothing to fear.

* According to the *Worcester* (the main white journal) and the *post of Pretoria* the Deputer party is a small party of men who are not in the Cape Colony in other than the Transvaal.

* The *Worcester* and the *post* were mentioned.

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the English and American residents were attached to the Transvaal, in the sense of regarding it as a permanent home. Most of them came or agreed to return to Europe or America, and the promise that even had the franchise been obtained after ten years' residence, few Anglo-Saxons would have pledged allegiance to England or the United States.* It was for this reason

reluctant to go for restriction.

But as I can learn, the great mistake of the Boers was in giving the Uitlanders grave cause for desiring to control the

oration for their convenience, without the franchise and without danger to the independence or the national character of the

put only to discomfort, favoritism, and conflicting interests beyond its own control.

The grievances of the Uitlanders have been very real indeed,

country. A few facts will illustrate this condition. The town of Johannesburg, the largest city, has over 50,000 white inhabitants and no perceptible system of drainage, no system of drainage, and no general water supply. There is no source of water in the

purely agricultural population is such that no water rights can be acquired of a single affected landowner or flock. The town has no general municipal government though there is a board of health. The state has refused until lately to aid in water works, except when used in Dutch. Fuel or necessities of more than

controlled by law and on a portion of its area the land reaches the utterly exorbitant rate of six shillings per ton per acre of coal. The company makes profits of 10% per cent, and yet it is re-

* It is possible that a considerable number of Afrikaners would acknowledge the

commitments of a like character have been threatened, though not

with lamentable results. There is no commission or any body

can be planned. The work is so arranged as to fail almost ex-

will not get except when made to do so.

agers at the needless difficulties thrown in their way and in

and it is not wonderful that resentment should have earned

also more money on the Rand during the last few years than ever before or in any other region. The direct personal discomforts to which they have been subjected have not been

of the United States or of Australia, all of which are much smaller than it is. Thus it cannot be denied that the current and

government were influenced by a sense of irritation due to new legislation in respect to the knowledge that the source of their prosperity was endangered by excessive taxation.

It is quite obvious that these causes of complaint could be

which the export is not constantly supplied. The problem is

Dr Loyds have successfully crippled during the past few months.

appointed by the president of the republic, almost precisely as an administration would depend only on securing able and honest men, as it is absurd to point out to the Tailanders the abuses of their government. The present tyrannical oppression of the Tailanders deserves a people to whom no sacrifices were

to the law, to a government the lawless under which the Tailanders are suffering, and to show the value they themselves put on liberty as to point out to just restraint upon others.

The Tailanders made repeated efforts, by passing resolutions

they met with no success. During the closing months of 1896

partly by residents of other portions of South Africa with a view

was hoped might induce the Tailanders sufficiently to bring about the needed changes. This seemed possible, because the Tailanders are supposed to number about 50,000 men and the Tailanders about 30,000* and all under

The plan of threatening the government with force of arms

not that while the grievances were acute, they were not great enough to justify armed revolt, and these men withdrew from

viz, the Germans and a few Frenchmen. The bad feeling and revolutionary action arising from this detention is not yet allayed. The

ing business was one of its results. While the Tailanders were fully

law of arms is under legal restrictions, originating in the necessity of limiting or suppressing the sale of guns to the blacks. To procure arms in any quantity, therefore, it was necessary to

* It is said that the Tailanders are very largely like the men, women, and children.

case. A portion of these arms was forwarded by members of the British South Africa Company, better known as the Chartered Company. An arrangement was also made with Mr Jameson, and it has been alleged at least suggested, that if matters were to go wrong at Johannesburg and the Boers would attack

rising with a body of men who as a matter of fact were chiefly policemen of the company.

The National Union had formed no part against the independence of the republic, their idea being either to frighten the administration into granting redress of grievances or at least to

overthrow such an administration, would treat conquered territory as equally well as tribute lands with Cape Colony. This in the

if needed, be rewarded reward for coming to the rescue of Anglo-Boers and could draw much in case of need.

The London Convention manifested its determination on December 20, 1895. On the 20th news was received that Mr Jameson had crossed the border, contrary to agreement and in spite of

the boundary. The same day the reform committee was formed expressly to advise, as the notice to members states, Jameson's crossing the border "in order if necessary to take a live step for the defence of Johannesburg and the preservation of order." Before dawn on the morning of the 31st the Boers received information that on Jameson's arrival the British flag would be hoisted. This was purely a success for all parties. Without any effort on their own part, the reformers were made partners in an attempt at conquest instead of rebellion. For the Americans the situation was particularly grave. For an American to

only Americans among the leaders, took the appropriate step as



would have been more serious consequences. I am not aware that any member, either American or English, deserted to the cause.

The reform committee was a small and ill-considered body, one of the fruiting of the Liberator's, coupled with Jameson's, misapprehension. It is therefore not to be expected that it lasted long. For the spirit of the moment to which Jameson had attached the committee in contravention of a distinct instruction. The Liberator's were therefore from the first point of view engaged in an attempt to con-

vince the Liberator's to do what they were not prepared to do.

In any case, it seemed useful to the Liberator's to organize themselves for self-defence.

In the rank and file of the reform committee there were six Americans. Messrs P. Melv, Joseph Story Curtis, and Victor H. Wood were known, both in the United States and in Africa as men of experience and managers; Mr Charles Sanders is a mining-engineer who has had remarkable success in the processing the chemical treatment of gold ores; Mr H. J. King is a partner in the mining owning firm of S. Newman & Co., London, and Mr P. J. Lupton is a senior merchant. These men joined the committee very much as it is. They did not know to what extent the Liberator party had become interested in trans-acting business, not did they stop to inquire. They assumed that the Liberator party was in a fixed form, and was for self-defence, and they did not stop to inquire, adopting any of the proceedings as a

body of business the agents of relatively of the transport. Of course

it is to be expected, either from the Liberator's or the Liberator's that there

any one of these Americans. Many of the Liberator's associates with them were equally good. It is not easy for the Liberator's to see that the Americans we did have been wise to take no part in the Liberator's revolt. It took a few days, on the other hand, it was very difficult to steer an even course over the

the news of the Liberator's. If some of our men went before they have taken their misadventure men; there has been no at-

tempt, at any rate, has been such as we expect, and have a right to expect of Africans.

Jackson and his troops were captured well, all their documents being even the key to the cipher dispatches. The detainees' belongings had been taken away, and most of the remaining companies were arrested. At the trial, in April 1848, of the prisoners,* including Mr Hammond, 1,400 of whom, on admission of consent to high treason, and the remainder upon and guilty to less important offences, Mr Curtis, who was chairman of the court in Cape Town, his trial was postponed. The leaders were in a ~~lower~~ court on April 24, but the next day their sentences were reduced to "seven years' imprisonment." The rank and file of the reform committee were given terms of imprisonment ranging from a few months to a couple of years. For some was no further investigation of any kind was warranted, and during the interval the government took occasion to establish a newspaper, and to be supported from Jackson's party, showing how well he had seen the plot to deprive the republic of its independence. Some of the names of the reformers as a price for money were to be disclosed, on payment of a fine of £2,000 each. Two of them only, both Englishmen, refused to sign any appeal for clemency, and to see get in prison, whose attitude seems to meet

Early in June the leaders also were released, on payment of the heavy fine of £20,000 each. They were given permission to remain in the Transvaal on condition of signing a pledge not to

refused to do, and he was promptly escorted to a border. Mr Curtis, when sufficiently recovered from a very dangerous illness, resumed his seat in July for trial, but refused to plead guilty. The government, however, declined to proceed against him on a plea of not guilty, evidently because he was worth to support the

country, and £20,000, the amount of his fine, was paid, to the advantage of the Transvaal, not caring to take pecuniary advantage of his enemy's own position.

The story of the of Mr Jackson, and his officers in the British

* Mr Charles Hammond, one of the five leaders, left the country before the arrest of his reform committee. The other leaders were Messrs. George Kappeler, James Phillips,

† The prisoners understood that there was an understanding between their captors and the government that in case a guilty verdict was followed by any disposition. This arrangement is wholly admitted by the prisoners on oath, and is admitted by the court by the defence. I have not been able to ascertain the origin of this arrangement. A crime would have resulted in some of the cases, and it is as well that it was avoided.

and written by the government of the Transvaal and their subsequent action has been need not be dwelt upon. The leader was condemned to be kept in jail in prison, with only special privileges, but he was shortly afterwards granted the status of a first-class prisoner and as a part of compensation, so far as I could learn, measures were passed so the raiders were regarded as the Transvaal as a legitimate but not excessive. The share of the Transvaal of the Transvaal Company in its responsibility for the raid is still to be foreseen.

Up to now the struggle in the Transvaal. The Transvaal are again pressing for reform, but there is no thought of revolt. The

ing at the other, but even they are gradually coming to a sense of justice demands.

The Revolution, though very able men in their own professions, have not a more perfect in the course of their work and as they were in the larger and more able to find the correctness of the Transvaal's grievances. The Transvaal's sense of the wrongs over their wrongs was largely advantage of to expect to be in a position to justify the revolution. The Transvaal government, on the other hand, has been able to give or tolerating even a small amount of expense for reform, but in the active contest which followed it displayed an ascendency for which the aid of its enemies was no matter. The nation of South Africa under British hegemony,

and are the center of the Free State, so, too, are four-fifths of the Cape Colony. The bond of sympathy between the Boers and the rest of South Africa has been drawn much closer during the past few months. The Afrikaner League in Cape Colony,

the Boers, is much stronger than it was, and the whole race now looks to the Transvaal, which is now in the position of intel-

lectual and political center. It seems today as if the political

like that of Prussia in the united Germany of forty or a year ago. The whole country is in a state of ferment, and a future of

is destined a larger measure of interest and activity from the world henceforth than hithert.

THE ECONOMIC ASPECTS OF SOIL EROSION

by DR. N. K. SHALIN,

Professor of Geology in Harvard University and Dean of the University

II

As the natural slope of a shower gather runs stream the water begins to act in an erosive way. If the gathering takes

the natural form it is which it is to expand on its path to the sea. When the rain comes down on high land, the first stage

is that of the natural division of a river system, we always find the surface eroded into steep-sided valleys. Commonly the main surface is composed of rocks ranging in declivity from five to thirty degrees or more, on which surface the soil, if it be present, is always moving down the face at a rapid rate. At the same

time a landslide down to the bed of the stream. There it for a short

time to the river channels. Commonly the movements of these earth

are to a few inches or a few inches a year; rarely to a foot or two

are covered with a thick layer of soil. During the movement

gravity inclines it to go. Arriving at the margin of the torrent,

waters and sent on its way to the sea.

turned fields. So long as the earth is covered by the normal forest growth the strong roads are likely to pass through the soil and fix themselves in the crevices of the underlying rocks and, except so to speak, the loose materials in their place. In this way we may almost find one of the effects of deforestation, as a cause, even where the better vegetation is allowed to develop, is to increase the rate at which the soil goes away to destruction. As yet this country has not been long enough exposed to the re-

almage. Perhaps the most striking are to be found in the Apennines, near Florence, where it is possible to walk for miles on mountain slopes without seeing but one thing—a bare rock flake which a century or so ago bore heavy forests matured at least a half a deep, soil. The last of the Medici who held these woods as a crown had cut the timber to supply provisions for the big beam cut of the trees, with the result that the forest which had been a protection from plagues, was swept away. It is a mountain area has been doomed to age-long sterility and a region made desolate which might well

CONCLUSIONS

The most serious centres of the old World, with our vast stretches of bare rock slopes which down to recent centuries were forested, and so of the destructive effects of man's prodigious assault on the earth. In the countries there has not been time for this process of destruction by the animals to a great extent, in a very serious way, yet in the Apennines we can see the effects of man's process. Forests of Pennsylvania there is, according to my rough estimate, based on a survey of all the states in that a land country, an area, or area of not less than three thousand square miles where the soil has been destroyed by the removal of the woods and the consequent passage of the earth by man or to the sea which is and to the sea. At the rate at which this process

is proceeding at a rate of one hundred square miles per annum; in other words, we are each year losing to the uses of man, through the necessary destruction, a productive capacity which may be estimated as sufficient to sustain a population of a thousand people.

In considering the destruction which the non-productive rain brings upon a country which is subjected to the loss of its vegetation, the most important fact to be remembered is that of the highland districts, for it is there that there are the steepest, on an average, slopes, the rainfall is greatest, and the action of frost is most considerable. There the process of erosion is the most rapid, and the results are the most remarkable. There are, however, no hills in the country or in any other where the waste due to drainage is not remarkably less than in the places, where the average inclivity of the surface is not more than one

necessary first step of drainage is to send a stream of the surface matter from the hills to the streams and then on to the sea. The casual observer who will walk for a day or so along a stream of rain will find among the banks of a mountain stream likely to find that some of the tributaries carry water which is nearly clear while others discharge a very muddy flow. Examining the cause of this difference he will note that the relatively clear brooks come from hills that are not thickly clothed in forest or grass, while those which are very muddy have a large proportion of their area under plow culture. While no extraction of a given field in a given time is greater in proportion to the steepness of its slope, there are practically no fields, however slight their inclivity, which are not exposed to the same considerable measure to this kind of washing. In a degree it is the

exhausting the natural growth of a soil that, here may be made of a rich and luxuriant vegetation. However carefully the work may be done, and whatever the nature of the crop, the earth is for the time being left the recipient of rain and wind.

The question may well be asked whether, if the soil is eroded, it is a necessary consequence of dilapidation, it is not certain that in time all the soils will go on their way to the sea, and the earth thus be made unfit for the use of man. The answer to this is that the natural regimen of the soil provides a way by which a certain amount of waste to the sea may be intercepted and usefully

utilized by the action of that part of the run-water which does not flow over the surface but finds its way into the soil, and is slowly yielded to the surface in the form of distinct springs or more common only in the broad sheet of water which flows along the bed-rock or the hard pan until it is too low drain-

no erosive effect. What material it takes away—a relatively small amount—is removed in solution. Generalized for the rock, the water, charged with carbonic dioxide and other compounds which aid to its decay-bruising effects, is used as the soil

stirrer just as brings the hard stones into the state of soil. In this way the natural wear derived from the solutions effected by the ground-springs and water, the water-gang and the rain, and the

In the state of nature the rate of degradation of the earth's surface over a region such as the Mississippi valley appears by direct measurement of Henry's and others to be not far from one foot in five thousand years. At this rate of erosion we may from the full evidence presume that the background scenery will keep somewhat on end of the wearing process, and so the soil rather gain than lose in depth. Under our present usage, such as is now applied to rice of low-lying land, it is hardly lower in as great an amount as exists in the valley of the Po, where the surface descends at the rate of about one foot in a thousand years. Under these conditions we may be sure that the turnover and replacement of the soil cannot compensate for the wearing, and that

1. *Soils of the country*

Before proceeding to a discussion of a civilised economic nature—those which concern the steps which should be taken to arrest the wasting of our soils—we will be well, for as to classify the processes and rates of erosion on two of the many varieties of soils which probably exist in this country—namely, those of overgrown waste-lands and those found in the alluvial plains bordering the great rivers. The first of these classes constitute about one-

the second is of a high humic or aggregate form, but on account of its excreting fertility is of a most equal degree of wear.

In generalised statistics experience shows that the rates of destruction of these are relatively small. This is owing to the fact

that, as the soil of these regions, is a most aboriginal deposit of debris so deep and so broadly averaged that the greater part

of the melt-water enters into the earth and thus is prevented from doing erosive work. The result is that even in times of flood the streams coming from these fields covered by glacial deposits are never very muddy; they have no important alluvial

deposits, and are such a permanent feature of the streams with flow from mountainous regions. The only trouble and even annoyance is that if they give us no concern, except on the steeper mountain

ridges occasionally exposing the bare rocks.

On the alluvial plains—at least so long as the low flooding of the stream bed does not leave them above the level of the flood—

settlement, and thus at a rate which is pretty sure to compensate for any waste which the most reckless agriculture can bring about.

of the same kind in it by the decay of the bed rocks. It is to this constant superficial gain of soil that due to it they owe their peculiar value as soil. A river or stream, however subjected to a peculiar kind of erosion—that brought about by the lateral encroachment of the river channels to new forms, the flood plains. These peculiar, peculiar movements of the great rivers through their deltaic accumulations are important for the reason that they are not easily controlled and are often disastrous to the interests of man who dwells upon their banks. The movements are often made in a very rapid manner, moreover, where the streams change their courses in one portion of the alluvial plains there, none of the currents is so altered that the current the riverward to the land, and subject to the same, is along. In the summer the Mississippi has been miles away from the flood-plains between Cairo and the sea.

The natural check to the enlargement of a river is found in the peat which accumulates due to the growth of trees upon its banks.

them to be seen in places where their roots and stems are killed by the floods for a few hours part of the year. These forms are fine roots which enclose the sediments deposited at high water, and they have a habit of growing in case of fire, so that their thickened stems arrest the current and cause a partial deposition of sediment on the gravel which they occupy. If such a forest develops on one side of a river while the banks on the opposite bank are not thus protected the result usually is

is worn away. Many of the stream-swingings are readily est-

ablished by the planting of nurse trees, these changes can be considerably reduced by the proper use of such devices.

From a large or extreme point of view, it will readily be seen that the changes in the courses of the great rivers are not very serious, and this for the reason that the area removed on the one

on the other side. It is not covered with the same extremes which

pressed against either bank. In these cases the waves of the

ment of the soil should be made. The loss of the soil from the river action is considerably from certain states which I have seen in the country in the basin of the Ohio river especially in that part of it which lies to the south of the main stream, it may be remarked that there is a gradual removal of the forests in many of the loss that has a place both a, outside of the forest section

this action

We have now glanced at a several places in which the soil is being, operating through the instrumentality of the winds the waves, and the rain tends to remove a great deal covering of the surface on which the substance of soil and the force of it. We may not in summarizing up the matter that the action of the waves is probably the most serious, but that the effort is, naturally to diminish the area of the lands, and the process goes on so slowly that the human eye does not notice it as very soon. The removal of the part of the land is worn away compensation is generally made by the shifting of other areas above the ocean level. The work of the winds in blowing away the soil the earth continues to sit, and that for the reason that the surface is well protected by the planting of vegetation. It is when we come to consider the action of the rain that we find the surface face to face with the

that in the state of nature the lands are protected against the

continues. If man occupies the earth under the same conditions as the other creatures of the land, he would not disturb the sur-

cent and beautiful relations of the early and the living world. In this case the wearing of the soil would go on, but at a rate not

of the bad-crops. The continents would gradually be lowered down, and in some measure by the direct wearing action of the

ways in the detritus.

The primitive man disturbed the equilibrium of the soil no more than did the lower animals. He made use of the natural

coast. It might be, to bury his dead; but the first step up which he began to make was as a navigator. He became a seafarer, and with the invention of this art began the greatest revolution in the movements of the earth; that has ever been instigated by a living being. Each extension of civilization has widened the field of destruction, until nearly one-half of all the land is subject to its ravages. It is now a question whether human culture which rests upon the use of land, can devise and

source of life so that it may support the mass of the people to come. If it cannot be done, we must look forward to the time—remote it may be, yet clearly discernible—when our kind, having wasted its great inheritance, will fade from the earth by reason of the ruin it has accomplished. It should be the province of science to point the way to the remedy for this ruin.

It seems to me to be the point of first importance—indeed, the first step to the restoration of what the earth can be made to yield—to find the way to without destruction but to see its resources. To obtain this can they need, in the first place, to know that the soil is being destroyed over the surface is that which is the work of soil destruction, so far as the surface water runs on the soil. The force is not. The force of the rain which is the earth does not, but it is the force in the temporary springs, which is the work of water. In a variable measure it is the force of the

power of matter of the springs; but the very first and destructive effect is on a naturally protected soil more than on a unprotected

the bad-crops, a process by which the soil is deeper and deeper. In the state of nature all the land is naturally and

THE ECONOMIC ASPECTS OF SOIL FROSTION

understood and to be brought to a proper perspective. In the condition of our modernized life we are largely a slave of the process.

3

of frost in the underlying rock, and which would be most useful to the crops if it is of any depth.

Although it is very difficult to make a new, satisfactory outcrop safe from the assaults of the rain, I believe that with a careful use of a large and even - sized system of fallage it can be done at least - provided the farmers can be persuaded to extend their operations and efforts. In the first place it should be noted that

the most important of all the work which is effectively done to maintain the earth, so that when the few inches of ground which become soaked with water the fluid cannot penetrate into the deeper parts of the earth. The reason for this is, of course, not so much really be understood. The presence of the foot of the rain, due to the force of thrust of the force used in dragging it forward

to reach the earth as well as to the weight of the instrument, serves as a very effective way to compact and secure the surface over which it passes. When the frost penetrates deeply, the

this effect of the power is almost all the less, especially those

of the southern part of this country, the conditions of the rain is to the sky but very evident. It needs but a comparison of a lot

of land which has been lying under the plow with a like area still in virgin forest to show the true measure of this action. The one is for a few inches in depth moderately open, but at a lower level is so hard, that water can penetrate it only in a slow way; the other is open to a depth of so great a depth that the rain

4

yet has a broken up.

The same is true of the instrument which will tend to make the character of the work, a new work which does not pack the under

movement of the water. As my friends will know, the nature of the surface is so that the water should be in a region of convenience, we may have to content ourselves for a reasonable time to come with the present, but to my mind by no means venereal, which has already sent the distance of a few miles of men to the sea. There are ways of using the power by which its evils may be mitigated. In the first place the only

should be made as deep as it well can be. The road serves as the earth board, and any take in a run-in of an inch or per-

cent in the land the water would have to pass over the surface. The well-known, but not a, only little used, process of wheel-rowing if correctly used is also a valuable means of effecting the penetration and storage of water, an action which also tends to the same end. In certain parts of the southern states of this country, where the evil effects of the surface flow have forced themselves upon the attention of the people, the farmers have sought to guard against the destructive action of this action by forming temporary benches in the elongated fields. In the Old World this system of benching the lands is carried no farther than it is in any part of this country. In Germany, France, and Italy a greater part of the land that lies on steep declivities which have not been brought to run in the ditch and has been conservative agriculture is now protected from destruction. Although we may expect a considerable improvement of this conservative treatment of our fields, we can not be too diligent for their safeguarding. Another class of preservation demands that the character of the lands of this country must be taken, and that we will have to do.

owing to the fact that in North America generally the rainfall is so heavy and character the precipitation is so heavy and at a rate which is not common in Europe and to the fact that these downpourings are likely to occur in groups of which the amount received by the land, once it is exposed, is a measure of a great much greater than that which it receives the fields of the Old World. There appears to be one way by which we may meet this danger—this is by putting the work of the law to those flows which have a degree of slope so slight that with proper usage they may not be exposed to serious action. Although this classification has to be made for each district and series of soil, it may in general be said that no field which has a greater slope than a five foot vertical in one hundred feet of length should in any country be exposed to the danger of the ordinary cropping tillage. Areas from the foot-slopes of the mountain upward to three times the rate of slope, or to a maximum of

ing them into the state of grass lands, but should not be

is no more than a necessity to retain them in this state. A. Lucas having a shore of more than fifteen feet to one hundred, should, by the rules which the conservator of the sea is supposed to lay down, be devoted to forests, which all the copy

owners will be ready to grant.

It may be asked how these rules can be enforced. After much consideration of the matter, I am satisfied that our only reliance is in an education which will bear in upon our people the duty they owe to the sea, and the ways in which they may discharge this great obligation. Our folk are careful, at every step in their action as they have striven, not for the moment's profit, but for the good of generations to come. If this noble motive be not checked by knowledge, we can trust to it for the remedy of our moral and intellectual ills of this country, which, to the extent of the number of acres which the sea is of a few generations' life upon a shore which is not fitted for the unending support of man, are not evil consequences of lack of care on the part of the people

have shown how far we have come, for a land of unbroken state. Think them would it be not possible to the kind interest that we have

pointed out the fruit of this knowledge.

It is much to be regretted that there is not in our schools a single book to tell the young what every one should know concerning

which the generation to which he belongs may pass on the

own can be enforced through the exertions of those who have been brought to sea the truth as well as willing to labor for the education.

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and they into which too rapidly drifted, of the danger of a general uprising of the natives throughout the whole of South Africa.

Her mission, and of the strenuous efforts of the president of the republic to encourage the nation and large to a sense of its "dignity and independence" and to induce it to enter into a confederation with the British colonies on the basis of the recognition of each as a free

people covering the period in question.*

All writers are agreed that at that time the Boers were utterly unable to defend themselves against the natives, therefore with the Boers had not a very substantially definite and protection for their numbers and property could be secured only by the payment of blackmail to the native chiefs. To add to the generalization created by the success of the Kaffirs at the battle of Zulu, and to add to it reason from the south, and the Boers were weakened by their own position to see with any proper conception of their obligations as a civilized government. Finally

where assumed a menacing attitude, and a conflict in that would have encompassed the whole of South Africa seemed on the verge of breaking out. What sort of Boers had at that time any

that even as they the Boers themselves never desire to show, but it is an inescapable fact that they exchanged their independent sovereignty, such as it was, for British protection, if not with an enthusiasm at variance with their own interests, at least with complete and satisfaction and a manifest sense of relief.

Two years or a little more after the annexation of the Transvaal the British, after sustaining several serious reverses, com-

to Soweto. Three months later, however, the Boers had been completely defeated, the complete overthrow of the Boers had been largely won, and the British authority was established.

The Boer republic which took place the following year.

While the two cases are not in every respect analogous, the consequences of the British in the annexations of the Boers are

*See *American Annual Cyclopaedia*, New York, Vol. 11, 186-77, 1868, "Africa," "Other Colonies," and "European Republics." See also the *Book of Facts* by the same author, New York, 1868, p. 101.

lands of the Indians. It is not the national government that is primarily at fault in the matter, but the money too tight, the stock-grower, too land-grabber. In all cases, however, the people are either too ignorant or too selfish to develop its resources for themselves, and the temptation to take possession is too great to be resisted by the restrictive measures that it does to governable spirits who have been inspired by some devastating centrifugal force to the periphery of civilization. [11]

SOCIETY SESSION 1895-'97

Special Meeting, October 9, 1896.—President Henshaw in the chair. Vice-President Tenison delivered an address on Recent Geographical Progress with especial reference to explorations in the Arctic Regions and Africa.

Special Meeting, October 20, 1896.—President Henshaw in the chair. A. T. Allen, of New York read a paper, with lantern-slides illustrating, on The Waterways of the United States, being

Special Meeting, October 27, 1896.—Pres. and children in the chair. Rev. John N. Macmillan, of St. Augustine, Fla., addressed the Society on The Geography of the Southern Peninsula of the United States, illustrating his address with lantern-slides.

MEMBERS.—New and renewals have been elected as follows:

October 3.—Wm. Reed, Hon. John B. Cotton, Wm. H. Harrison, Mrs. E. E. Banks, Chas. K. French, Maj. Clement de Grandpre (France), Mrs. Mary M. R. Hill, Chas. W. Little, Mrs. Rosa McCabe, James A. Johnson, C. F. Sanders, Prof. J. L. Stone, Wm. Steele, Mrs. P. M. Stocking, Chas. W. Thompson, Wm. Van Dyke, Fred C. Warman, Fletcher White, Mrs. Earl M. Wilson, Dr. James Woodrow W., Gordon Woodward, Mrs. M. Zimmerman.

OBITUARY.—The Society has to deplore the deaths of the following members: Mr. Edward Russell, an old and much respected citizen of the District of Columbia, for many years connected with the U. S. Land-grant Survey; Mr. George S. Akeley, a man of remarkable abilities and one of the most skilful and intrepid of naturalists and explorers, who lost his life by falling down the great precipice of Mt. Lafayette, Alberta, when engaged in the exploration of that almost inaccessible mountain, in company with other well-known members of the Appalachian Mountain Club; and the Hon. Edwin Wilcox, D. C., successively Member of Congress, President

of the U. S. Commission for the Work at the World's Columbian Exposition, and a member from 1863 to 1885 of the Board of Managers

of the Statistical Geography Society, an able and energetic and executive chairman and a faithful friend. J. H.

GEOGRAPHIC NOTES

ASIA

1894. The total length of the railways of China on March 31, 1894, was 6,677 miles, an increase of 822 miles during the year. In addition, there were 6,790 miles the construction of which was authorized, but which were not yet in operation. The proportion of passenger traffic was one to seventy miles, and the total number miles traveled or traveled from railway accidents of a hundred was only 1 in 518,331.

Notes. An important addition to geographical knowledge is expected to result from the journey across Tibet recently undertaken by Captain H. H. P. Lowe, an officer of the British Army. Captain Lowe has traveled into the different streams he may encounter water-gate canals containing the remains of Chinese and French but an accurate knowledge of the rivers is not yet found but the former will be of great value to the Royal Geographical Society, London. It is hoped that some of them may be found in the Brahmaputra Salween and Mekong and to help to solve the problems of the origin and construction of these rivers.

1894. Of the two parts of the world to be returned to the world under the treaty with Japan, that of the great river is the more important. A city of 50,000 inhabitants and the great river is perhaps the largest in the world, it is the capital of Chekiang, a province containing the most extensive silk and tea culture in the world. It is believed that the opening of a port will revolutionize the commerce of China, and direct commerce between the river and the North, the natural harbor of Hangchow. The Chinese state of the river is a substantial, produces two-thirds of

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province. Other exports of great importance are straw goods, wax, silk, hemp, and iron, and vegetable oil from the tea tree.

The works of a historical geography are due to Messrs. J. Scott Keltie and H. E. Howard Mill for the painstaking care with which they

" "

were in London in 1893. This historical volume of 1,000 pages is a worthy and useful outcome of these geographical works, marked by fact, courtesy, and ability, by which its editors, in their capacity as geographers, contributed so greatly to the progress of the subject. Among the more important

" "

Geographical, Chapman on the Map of Africa, Leakey on the

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Pour Explorations, and Walker on the Geographical Survey of India. Leakey's new revised Catalogue of the Exhibition is of permanent value.

A. W. G.

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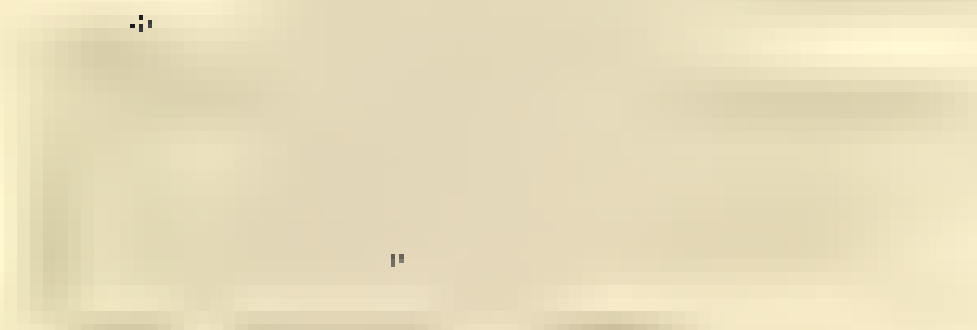
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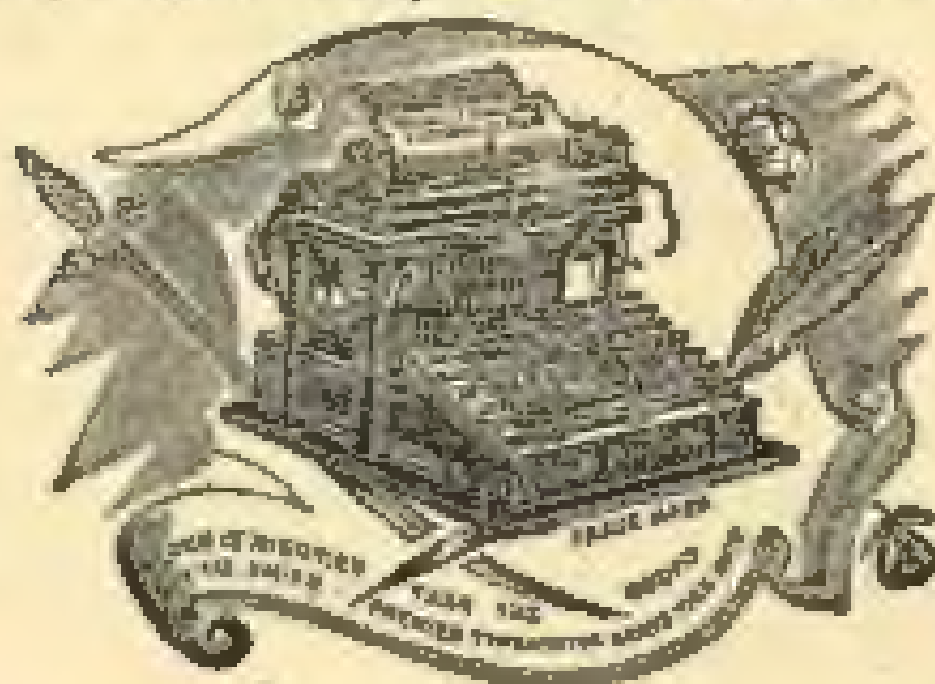
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